

What is claimed is:

1. A mirror device comprising a mirror substrate having a mirror which is driven by a predetermined distance-dependent driving force and a support substrate which
5 supports the mirror substrate,

wherein the mirror substrate includes:

at least one first mirror-side operating region on which the distance-dependent driving force acts, the first mirror-side operating region being integrally formed with the mirror and provided at a different position from the mirror; and

10 at least one second mirror-side operating region on which the distance-dependent driving force acts, the second mirror-side operating region being provided at least one of one end of the mirror in a direction in which the mirror is driven and an opposite end of the mirror that is opposite the one end,

wherein the support substrate includes:

15 at least one first opposite-side operating section, the distance-dependent driving force acting between the first opposite-side operating section and the first mirror-side operating region; and

at least one second opposite-side operating section, the distance-dependent driving force acting between the second opposite-side operating section and the second
20 mirror-side operating region,

wherein the first and second mirror-side operating regions and the first and second opposite-side operating sections are formed so that an attractive force is generated as at least part of the distance-dependent driving force, and

25 wherein at least one of the mirror substrate and the support substrate is formed so that a gap between the first mirror-side operating region and the first opposite-side operating section is narrower than a gap between the second mirror-side operating region and the second opposite-side operating section.

2. The mirror device as defined in claim 1,

wherein the first and second mirror-side operating regions and the first and second opposite-side operating sections are formed so that generation of an attractive force that is generated between the first mirror-side operating region and the first opposite-side operating section stops in order to restore a part of the mirror substrate other than the mirror to an original position, in a state that an attractive force is acting between the second mirror-side operating region and the second opposite-side operating section.

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3. The mirror device as defined in claim 1,

wherein the support substrate is formed as a step-like shape so that the gap between the first mirror-side operating region and the first opposite-side operating section is narrower than the gap between the second mirror-side operating region and the second opposite-side operating section.

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4. The mirror device as defined in claim 1,

wherein a plurality of the first mirror-side operating regions are disposed at a predetermined interval in a direction intersecting with a direction in which the mirror is driven, and

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wherein a gap between the first mirror-side operating region positioned farthest from the mirror and corresponding one of the first opposite-side operating sections is narrower than a gap between the first mirror-side operating region positioned closest to the mirror and corresponding one of the first opposite-side operating sections, so that a gap between the second mirror-side operating region and the second opposite-side operating section is gradually narrowed by causing an attractive force to act between the first mirror-side operating regions and the first opposite-side operating sections in order

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from the first mirror-side operating region positioned farthest from the mirror to the first mirror-side operating region positioned closest to the mirror.

5. The mirror device as defined in claim 1,

5 wherein the mirror substrate includes a rotational shaft portion which is integrally formed with the mirror and rotatably supports the mirror, and

wherein a plurality of the first mirror-side operating regions are formed on an axis of the rotational shaft portion on two opposed sides of the mirror.

10 6. The mirror device as defined in claim 1, wherein the distance-dependent driving force is a coulomb force.

7. The mirror device as defined in claim 1, wherein at least one of the first and second mirror-side operating regions and the first and second opposite-side operating
15 sections are electrodes.

8. The mirror device as defined in claim 1, wherein the mirror substrate is a conductive silicon substrate.

20 9. An optical switch having the mirror device as defined in claim 1 and switching an optical path by driving the mirror.

10. An electronic instrument including the mirror device as defined in claim 1.

25 11. A mirror device driving method for driving a mirror device including a mirror substrate having a mirror which is driven by a predetermined distance-dependent driving force and a support substrate which supports the mirror substrate, the method

comprising;

acting the distance-dependent driving force between at least part of the mirror substrate and at least part of the support substrate;

5 forming the mirror substrate and the support substrate so that a gap between a part of the mirror substrate positioned away from the mirror and a part of the support substrate positioned opposite to the part of the mirror substrate positioned away from the mirror is narrower than a gap between the mirror and a part of the support substrate positioned opposite to the mirror;

10 gradually narrowing gaps between parts of the mirror substrate and parts of the support substrate positioned opposite to the parts of the mirror substrate so that the gap between the mirror and the part of the support substrate positioned opposite to the mirror becomes narrower, by generating the distance-dependent driving force towards the mirror from the part of the mirror substrate positioned away from the mirror and the part of the support substrate positioned opposite to the part of the mirror substrate
15 positioned away from the mirror; and

driving the mirror by generating the distance-dependent driving force between the mirror and the part of the support substrate positioned opposite to the mirror in a state that the gap between the mirror and the part of the support substrate positioned opposite to the mirror has been narrowed.

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12. The mirror device driving method as defined in claim 11, comprising:

driving the mirror by stopping generation of the distance-dependent driving force that is generated between a part of the mirror substrate other than the mirror and a part of the support substrate positioned opposite to the part of the mirror substrate other
25 than the mirror, and widening a gap between the part of the mirror substrate positioned away from the mirror and the part of the support substrate positioned opposite to the part of the mirror substrate positioned away from the mirror, in a state that a gap

between the mirror and the part of the support substrate positioned opposite to the mirror has been narrowed.

13. The mirror device driving method as defined in claim 12,

5 wherein the mirror substrate includes a rotational shaft portion which supports the mirror so that the mirror is rotatable, and

wherein when the gap between the part of the mirror substrate positioned away from the mirror and the part of the support substrate positioned opposite to the part of the mirror substrate positioned away from the mirror widens, the mirror is rotated by
10 moving the rotational shaft portion away from the support substrate in a state that one end of the mirror has been brought close to the support substrate.

14. The mirror device driving method as defined in claim 11, wherein the distance-dependent driving force is a coulomb force.

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